

A transactional perspective on reading difficulties and Response to Intervention

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A Response to Intervention (RTI) model proposes identification of students with reading difficulties on the basis of a series of progressively more intensive instructional interventions over extended periods of time. Learners with serious reading difficulties are those whose difficulties are not resolved by the interventions. Three advantages of an RTI approach include that children need not wait to fail (Vaughn & Fuchs, 2003) to be eligible for support, RTI avoids problems associated with process-deficit and discrepancy models, and RTI is instructionally grounded, enhancing the ecological validity of the diagnostic process and more clearly grounding it in subsequent instruction. But RTI is not without detractors (e.g., Gerber, 2003; Scruggs & Mastropieri, 2003). We too have reservations about its assumptions related

to reading difficulties, because these assumptions have implications for the ways we conduct and interpret research responding to the needs of struggling readers.

Although literacy educators and special educators draw on common historical roots, even in the mid-1970s when special educators settled on a working definition for reading disabilities based on factors internal to readers, literacy educators had begun to move toward a broader transactional perspective that views reading difficulties as situated in variable social and cognitive contexts. Whereas traditional definitions adopted by special educators locate disabilities *within* readers, literacy educators more commonly view disabilities within broader social and instructional contexts where reading occurs. Ultimately,

although we view RTI as a generally positive step toward a more transactional perspective, it is our view that many RTI approaches do not go far enough in acknowledging chronic problems in our efforts to define and to respond to severe reading difficulties. RTI approaches may even undermine rather than support the literacy learning of students.

To explain our perspective, this essay consists of four parts. In the first part we consider views of deficit, difference, and variability that have played important roles in the thinking of both special educators and literacy educators during the previous 30 years. In the second part, we explore pedagogical implications of a natural-variability model of reading that is central to our thinking. In the third part, we explore what a perspective based on natural variability suggests about teacher education and broader issues related to implementing RTI. The final section of the essay presents conclusions and highlights some connecting themes across the four articles that make up this NDR collection.

Conceptualizing reading difficulties: Deficit, difference, and variability

In this section we review categorical, discrepancy, and transactional views of reading difficulties. Categorical and discrepancy views have long histories as conceptions of reading difficulties (Snow, Burns, & Griffin, 1998), often founded on cognitive theories of knowledge and learning (e.g., Anderson, 1985; Haugeland, 1981; Just & Carpenter, 1987). A transactional view draws on work in situated cognition (Anderson, 2003; Brown, Collins, & Duguid, 1989; Clancey, 1997), sociocultural theories of literacy (Gee, 2001; Jiménez, 2000), and learning theory with a more instructional focus (Clay, 2001; Rosenblatt, 1994). We note as well that our review of these conceptualizations of reading difficulty is not purely descriptive, because we make evaluative judgments about the adequacy of these approaches both in accounting for empirical research and in supporting instructional practices. Ultimately we conclude that a transactional view more consistently meets our needs both as researchers and as instructional practitioners.

A categorical view of reading difficulties

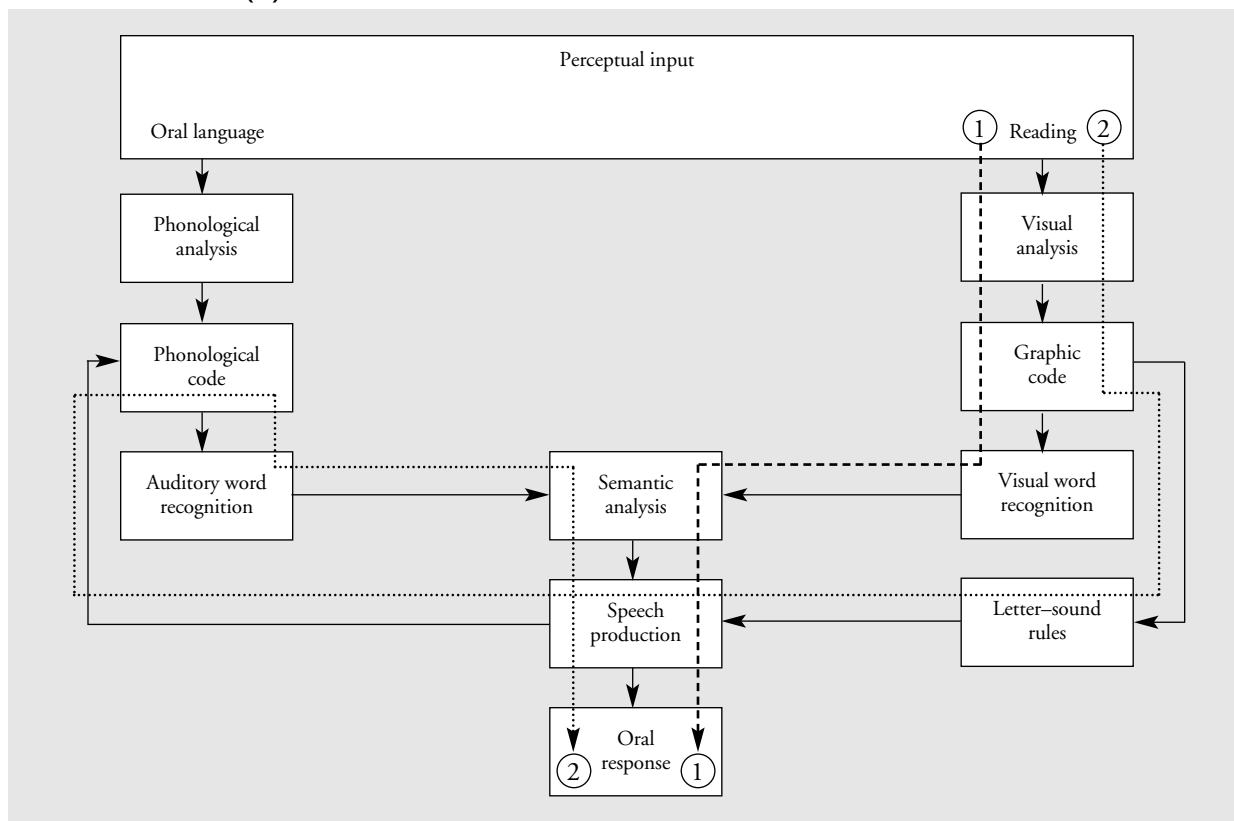
Categorical views arose in studies of readers whose difficulties were associated with specific brain

injuries. Kussmaul (1877) introduced the concept of *word blindness* for acquired reading disorders in adults, and subsequent work by Morgan (1896), Fisher (1905), Hinshelwood (1900, 1917), and Orton (1925) suggested similar symptoms in children might be congenital. As a result of this medical history, when educators began to attend to developmental problems there was often an assumption of underlying brain dysfunction. Process deficit models of disability grew out of that view, but relied on an information-processing perspective that treated reading as the flow of information across cognitive processing systems responsible for aspects of reading such as visual perception, word recognition, and phonemic analysis.

Process deficit models influenced the views of both researchers and educators because they provided a framework that could, in principle, distinguish different types of disabilities with implications for instruction. Figure 1 presents an example of a dual-route reading process model (Castles & Coltheart, 1993; Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001) that illustrates two distinct cognitive pathways resulting in predictions about disability types and symptoms that have implications for intervention. Pathway 1 provides a *visual* route to reading, while pathway 2 represents an *auditory* or *phonological* route. According to the processing deficit framework, when one path breaks down, readers rely on the other pathway, resulting in distinctive symptoms. Problems in pathway 1 are thought to lead to *dyseidetic* (Boder, 1970), *visual* (Johnson & Myklebust, 1967; Myklebust & Johnson, 1962), or *surface* (Castles & Coltheart, 1993; Coltheart, Masterson, Byng, Prior, & Riddoch, 1983) dyslexics who have difficulty sight reading and tend to overrely on phoneme-grapheme correspondence rules that are ineffective with visually distinct but phonemically irregular words. Problems in pathway 2, on the other hand, lead to *auditory* (Johnson & Myklebust; Myklebust & Johnson), *phonological* (Beauvois & Derouesné, 1979; Castles & Coltheart) or *dysphonetic* (Boder) dyslexics who make limited use of phoneme-grapheme correspondence rules, and tend to overrely on orthographic recognition.

One reason for the appeal of the process deficit model is the relative simplicity and elegance of a framework that integrates oral language, reading, and sensory processing, resulting in a taxonomy of disability types based on observed symptoms. A second reason is the presumption, sometimes explicitly stated, that cognitive processing would ultimately be grounded in the scientific study of brain function, tapping methodological approaches already demonstrated as

FIGURE 1
A SIMPLIFIED DUAL-ROUTE MODEL OF READING INDICATING VISUAL (1) AND
PHONOLOGICAL (2) ROUTES LEADING TO SPECIFIC PROCESS DISABILITY SUBTYPES



powerful diagnostic tools in medicine. A third reason for the popularity of the process deficit model is that this approach provides a basis for a logic of instruction grounded in strengths and weaknesses of readers.

Unfortunately, the process deficit model is a case of beautiful theory and ugly facts. In studies carried out over the last three decades, research has failed to provide reliable evidence that disabled readers can, in fact, be sorted into distinct categorical types. Even the most basic diagnostic task of distinguishing disabled readers from garden-variety poor readers has proven to be unreliable on the basis of processing deficits (Arnett, 1977; Lovell, Gray, & Oliver, 1964; Mann, 1979), and studies examining instructional strategies based on process deficits do not support their effectiveness in promoting learning (Hammill & Larsen, 1974, 1978; Kroesbergen, Van Luit, & Naglieri, 2003; Naglieri & Johnson, 2000; Vaughn & Linan-Thompson, 2003; Yssledyke, 1973). As a result, although some researchers continue to advocate process deficit models (e.g., Coltheart et al., 2001; Wolf & Bowers, 1999), most educators are abandoning them (Gresham, 2002; Reschly &

Yssledyke, 2002; Torgesen, 2002; Vaughn & Fuchs, 2003). There is just too little evidence across too much time to claim that specific process deficits provide an adequate basis for understanding difficulties in reading, much less for providing a suitable instructional response (see Coles, 1987, for a review).

A discrepancy view of reading difficulties

Studies that fail to support a process deficit model are sometimes claimed to support a less cognitively specific statistical model that views reading ability as normally distributed along a continuous dimension (Snow et al., 1998, Chapter 3), and disability as a *discrepancy* between general and specific measures. In a discrepancy model, there are usually no hard-and-fast distinctions to be made between so-called normal and disabled readers, who are all assumed to make up a larger population with most readers falling in the middle of the distribution and relatively small numbers of readers in the tails (Pearson, 1999; Snow et al.). In addition, like other

dimensional assessments (e.g., intelligence, blood pressure, response latency), there is typically an assumption that reading ability represents a complex mix of interrelated factors. The discrepancy approach to defining reading difficulties, however, continues to rely on factors within individuals. Although the hope of establishing a *causal* model is set aside (i.e., the hypothesis of a “broken” process is abandoned), a more general *statistical* model (Willson, 1987) remains and the reader continues to serve as the locus of the disability, with explanations and instructional approaches based on individual attributes.

A discrepancy model of disability has long served as the primary operational definition for researchers and practitioners in special education (Frankenberger & Fronzaglio, 1991; Mercer, Jordan, Allsopp, & Mercer, 1996) and was once widely applied by reading educators as well (Harris & Sipay, 1985). Like the process deficit model, the discrepancy model has deep historical roots dating back to Franzen’s (1920) Accomplishment Quotient (AQ), a ratio of achievement relative to IQ. Numerous subsequent analyses over many years (Chapman, 1923; Crane, 1959; Cureton, 1937; Popenoe, 1927; Toops & Symonds, 1922) noted problems with the AQ as a psychometric and diagnostic measure, but the idea that differences between general measures of ability and specific measures of reading might reflect a discrete diagnosable condition persisted and reemerged in the mid-1970s in the Isle of Wight studies (Rutter & Yule, 1975) examining discrepancies in distributions of intelligence and achievement. Specifically, although intelligence was normally distributed, there was a hump in the lower tail of the achievement distribution that was interpreted as revealing a group of children with “severe and specific reading retardation which is not just the lower end of a normal continuum” (Yule, Rutter, Berger, & Thompson, 1974, p. 10, as cited in Kavale, 2002).

Follow-up studies, however, failed to display the distributional hump that had been noted, suggesting the observed effect was a measurement anomaly (Van der Wissel & Zegers, 1985) and that children who experience even severe reading difficulties are simply readers in the lower range of a normal distribution (Shaywitz, Escobar, Shaywitz, Fletcher, & Makuch, 1992; Stanovich, 1991, 1993). Moreover, numerous empirical studies have failed to document reliable differences between readers diagnosed as low achieving and learning disabled (e.g., Fletcher et al., 1994; Stanovich & Siegel, 1994; Vellutino, Scanlon, & Lyon, 2000), and meta-analyses designed to generalize on the substantial research base in this area have discerned only small or

negligible differences between these groups (Fuchs, Fuchs, Mathes, & Lipsey, 2000; Hoskyn & Swanson, 2000; Stuebing et al., 2002), except for those variables that, not surprisingly, were used in defining groups in the original studies (Fletcher & Denton, 2003; Fletcher et al., 2002).

Even as the discrepancy approach was first institutionalized in the United States on a national level by its inclusion in the Education of All Handicapped Children Act of 1975, its limits and associated problems were well known and widely cited (Gresham, VanDerHeyden, & Witt, 2005). Some have suggested its appearance in this important and influential legislation had more to do with the hurry to establish some sort of practical diagnostic procedure in the face of the failure of the processing deficit model (Gresham et al., 2005). Although measurement problems were a concern, the immediate need to define criteria that could serve as a basis for funding special education services was critical. Remarkably, however, 30 years of research reinforcing those concerns have had little impact. The most recent update to federal legislation funding special education (the Individuals With Disabilities Education Improvement Act of 2004; IDEA) retains the process deficit model as its underlying conceptual framework and discrepancies as diagnostic indicators of disabilities in reading, although it also introduces RTI as an alternative approach. Furthermore, although a discrepancy model represents a significant shift from an explicitly causal to a more statistically grounded model, localization of disability within the individual reader remains a fundamental premise, a position challenged by a transactional view of reading and reading difficulties (Clay, 1987, 2001; Gerber, 2003), the position to which we now turn.

The transactional view of reading difficulties

Much of the research on reading difficulties has sought to distinguish low-achieving readers from those with a reading disability. A transactional perspective on reading and reading difficulties, however, advocates that understanding the natural variability of readers is more important and productive than diagnostic categories that have more to do with funding policy and legislation than they do with learning to read. In contrast with deficit-oriented views, a transactional perspective (Clay, 2001; Dewey & Bentley, 1949; Gerber, 2003; Rosenblatt, 1994) adopts a broader, pragmatic, and situated view of

reading (Anderson, 2003; Brown et al., 1989) within the complex social contexts and events in which it occurs. In this view, reading ability is not a property of the reader and may vary widely depending on contextual circumstances. Moreover, educators have found this emphasis on natural variability across environmental contexts to be an important pedagogical idea, both because it better reflects the complex circumstances of the classroom and it focuses more directly on the contributions teachers can make to supporting successful reading. Unlike process deficit and discrepancy models, a transactional perspective more directly addresses the ultimate goal of diagnosis: resolving reading difficulties, and this is one aspect of the RTI approach that we believe has considerable promise.

Unfortunately, although RTI represents an important shift from the problematic models of the past, implementations of RTI that have been proposed continue to rely on elements of the process deficit and discrepancy models. This tendency is most readily apparent in the largely undefined qualifications requiring scientifically based instructional interventions that adhere to standard protocols that are delivered with fidelity. Gerber (2003) argued, and we agree, that these requirements exclude the most immediate conditions that support learners: the teacher, classroom, school, and cultural variables within which any instructional approach operates (see Klingner & Edwards in this issue). It is difficult to understand what kind of responsive instruction is intended when adherence to standards is the guiding principle, and a commitment to science would be more convincing if the legislation advocating this approach (IDEA) did not also continue to cite deficit and discrepancy models. Moreover, whereas it might be argued that these requirements help us meet a clear policy need (i.e., whose education is to be funded with special education dollars?), codifying this approach in legislation is premature given the absence of large-scale studies justifying its use (see Gersten & Dimino in this issue).

As a result, whereas the legislative imprimatur on RTI may open new doors, it may also lead to the same kinds of problems that resulted when definitions based on process and discrepancy models were pushed into the legislative mandates that first defined learning disabilities (i.e., Education of All Handicapped Children Act of 1975). Although we agree that rejecting RTI because of the inertia of past practice would be inappropriate, we are concerned that the potential of RTI to contribute to instructional practice will be undermined by a continuing preoccupation with *disability* (see Klingner &

Edwards in this issue). We are also concerned that, in the push to implement reform, so little attention has been paid to the well-developed research base focusing on the natural variability of readers and those models in literacy education that address the specific issues and concerns that RTI now seeks to address (Hiebert, Colt, Catto, & Gury, 1992; Juel, 1996; Matthews & Kesner, 2003; Pinnell, Lyons, DeFord, Bryk, & Seltzer, 1994; Schwartz, 2005b; Wasik & Slavin, 1993).

Finally, we are concerned about characterizations of science solely in terms of traditional experimental and quasi-experimental methodologies that create unproductive divides between research and practice (Eisner, 1992; Erickson, 1992; Salomon, 1991). Although we do not argue with the potential utility of experimental work to inform practice, there is an enormous and, in our view unwarranted, leap from this proposition to the thesis that responsive instructional practice can be patterned after an experimentally validated standard protocol. Ultimately, we believe our goals as educators should focus on practical outcomes: to eliminate reading difficulties where possible and to ameliorate them where elimination seems out of reach. When theoretical constructs and experimental work contribute to this objective, we support them. It seems to us, however, that the scientific study of reading disabilities over the previous 30 years has contributed far less to our goals than we would hope and, as scientists, we should be prepared to ask why. We believe the reason lies in a preoccupation with identifying disabilities rather than attending to the ways instruction can build on the natural variability of readers.

Contingent teaching as a response to natural variability

In the first part of this essay we considered conceptualizations of reading and reading difficulties, arguing that process deficit and discrepancy models and the instructional approaches they suggest are not supported by empirical research. Whereas RTI has been advocated as a response to this problem, we are concerned that the pressure of funding policies and historical precedents may undermine the potential of RTI to transform the way we respond to children with severe reading difficulties. In particular, we do not believe that RTI puts enough emphasis on the individual character of responsive teaching and continues to emphasize identification of disabled readers. In this section, we present a variation on the RTI

approach that we refer to as *contingent teaching*. Contingent teaching resembles the problem-solving approach to RTI (see Fuchs & Fuchs in this issue), but differs in its rejection of traditional diagnostic practice and the construct of disability itself. Although contingent teaching has been implemented in a variety of formats and contexts (Duffy, Roehler, & Putnam, 1987; Pressley et al., 2001; Roehrig, Pressley, & Sloup, 2001), we will focus on a one-to-one tutorial approach such as adopted in Reading Recovery (Clay, 1987, 2001). We believe that approach addresses many of the concerns related to disability models, as well as two important issues that RTI has not adequately addressed: (a) scaling up from prototypes and (b) defining a teacher-development model that can sustain the intervention program once it is implemented.

One of the most important characteristics of contingent teaching is a commitment to a transactional view of reading that rejects the construct of disability as traditionally understood. A transactional view of ability implies that even the most highly effective standardized classroom instruction will result in varying levels of literacy performance, particularly for cohorts of students who enter school with great variation in their literacy experience (see Klingner & Edwards in this issue). A year of classroom instruction usually provides more than enough information to identify students at risk for continued learning difficulties (Juel, 1996; Schwartz, 2005b), and intervention at this point has the greatest likelihood of returning a child to a normal learning trajectory. In contrast, delaying the intervention, as was often the case with discrepancy models for identification, dramatically increases the gap between an at-risk child and more normally progressing peers.

We focus on an instructional approach that we consider optimally effective: an intervention by a highly trained teacher, working one to one with a child and making contingent decisions based on careful observation of what the child can do. This type of contingent teaching requires the orchestration of effective instructional decisions based on both a complex theory of literacy learning and a theory of the child's current level of literacy processing (Clay, 2001). The teacher enables the child to perform successfully by balancing instructional contingencies that vary the level of support provided, the domain contingencies related to the focus of instruction, and the temporal contingencies, including if and when to respond to the child's attempts (Wood, 2003; Wood & Wood, 1999). Decisions related to each of these forms of contingency are guided by a teacher's overarching goals of supporting a child and

accelerating the rate of literacy learning (Clay, 2001; Schwartz, 2005a).

Contingent teaching of this type is based on a social-constructivist view of learning and instruction in which the teacher and student collaborate on literacy tasks (Clay & Cazden, 1990). Figure 2 contains one instance of a child-teacher interaction from a Reading Recovery lesson illustrating the processes and principles of contingent teaching when working with a child at an early stage of literacy development. The child in this example read a sentence accurately, except for two meaningful and structurally correct substitutions: *meet/make* and *neighbors/friends*. The task of the teacher is to decide how to respond to the child based on the immediate context, knowledge of the child's understanding, and a theory of literacy learning and instruction (Clay, 2001; Schwartz, 1997, 2005a). The teacher could respond to both errors, ignore both, or select one in creating an instructional interaction. The indication that the child has noticed a discrepancy in the substitution of *neighbors* for *friends* informs the teacher's decision to focus the interaction here. Because the child is at least partially aware of the difficulty, the teacher builds on strength by supporting the use of meaning and structure, but also builds on a developing monitoring process by asking what letter would be expected at the beginning of the word if an attempt was correct.

Given a general prompt to search for an alternative response, "think about the story and what would look right," the child is unable to independently provide a response. Rather than drag the child toward a response, the teacher provides a higher level of support by suggesting alternatives. The child confirms the correct response, further reinforcing the monitoring process the teacher has just introduced. Certainly many other decisions are possible as well, even in the limited context established by the child's reading of this one sentence. Decisions based solely on decoding might focus on the *meet/make* substitution because *make* could be easier to decode than *friends*, but this response ignores critical elements of contingency related to the child's developing awareness at the point of error (Clay, 1998, 2001).

As indicated previously in this essay, the example we have chosen to illustrate contingent teaching is drawn from Reading Recovery, an early intervention program that is widely disseminated, extensively researched, and incorporates a professional development model explicitly designed to support individual contingent instruction of at-risk first-grade students. More than two decades of development and dissemination provides evidence of the effectiveness of this type of program in supporting the literacy learning of

FIGURE 2
CHILD-TEACHER INTERACTIONS IN CONTINGENT TEACHING

Text: And my dog Willy loves to make new friends.

Child: And my dog Willy loves to meet new neighbors. (Pausing, seemingly puzzled over the *neighbors/friends* substitution.)

Teacher: What you said made sense and sounded right, but over here, you said *neighbors*. It could be, but what letter would you see at the beginning of *neighbors*?

Child: N.

Teacher: (With her thumb, reveals only the first letter in *friends*.)

Child: There's no n. f—f— (Articulating the first sound, but unable to come up with *friends*.)

Teacher: (Noticing the child's hesitancy.) Right, so think about the story and what would look right. It can't be *neighbors*, that wouldn't look right. (Pausing and waiting for the child to provide the correct word, but in the absence of a response, asks) Could it be *people*, *buddies*, or *friends*?

Child: *Friends!* (Rereads, with the same substitution of *meet* for *make*, but this time, correctly reading *friends*.)

Teacher: Good fixing! It makes sense and sounds right, and now it looks right!

children who have struggled to learn in the classroom context during their first year of school (Schmitt, Askew, Fountas, Lyons, & Pinnell, 2005). The effectiveness of this approach also is demonstrated in the national evaluation data published each year in the United States on the over 140,000 children served in Reading Recovery (Gomez-Bellenge, Rodgers, & Schultz, 2005) and a number of experimental studies (Center, Wheldall, Freeman, Outhred, & McNaught, 1995; Iversen & Tunmer, 1993; Pinnell et al., 1994; Quay, Steele, Johnson, & Hortman, 2001; Schwartz, 2005b). This research clearly demonstrates that trained teachers, working in a one-to-one context that provides contingent instruction for the most at-risk first-grade students, can return approximately 80% of these students to average levels of literacy performance in a short-term intervention limited to a maximum of 20 weeks. There is also evidence to indicate that the intervention reduces retention in grade (Lyons & Beaver, 1995), referrals to special education (O'Conner & Simic, 2002) and that gains made during the intervention are sustained in later grades (Askew et al., 2002; Briggs & Young, 2003; Brown, Denton, Kelly, & Neal, 1999; Hurry & Sylva, 1998; Pinnell, 1989; Rowe, 1995).

These findings do not imply, however, that all Reading Recovery teachers are equally effective in providing contingent instruction. Lyons, Pinnell, and DeFord (1993), for example, provide an analysis of variation among more and less effective Reading Recovery teachers, particularly during the writing component of the lesson. Rodgers (2000, 2005) provides further illustration of the challenges involved in responding to the developing needs of learners in a one-to-one tutorial context. Contingent instruc-

tion is difficult. It is a skill that can never be mastered completely; it needs to be constantly developed and refined in the context of working with children. As a result, it will not be enough to simply define an instructional model for thinking about literacy learning; we must also consider the kinds of teacher education and professional development that will be needed to support an ongoing program of responsive contingent instruction.

Teacher education and professional development

An RTI model based on a transactional view of ability and contingent teaching highlights the central role of the teacher, and therefore raises research questions about teacher education and professional development. Meta-analyses of tutorial programs such as Elbaum, Vaughn, Hughes, and Moody (2000) indicate that volunteers and college students may be as effective as teachers with some students in certain instructional contexts, suggesting that the cost of one-to-one instruction can be significantly reduced. Early intervention research (Elbaum et al., 2000; Pinnell et al., 1994), however, shows that professional development increases the effectiveness of one-to-one interventions for beginning readers. Because many of the policy arguments among competing approaches center on cost effectiveness, it is critical that these kinds of issues be explored, but there is very little research of this type.

Cost-effectiveness research requires a comparison between at least two interventions trying to accomplish similar goals with samples from the same

population of students (Hummel-Rossi & Ashdown, 2002; see also Klingner & Edwards in this issue). Cost effectiveness is usually defined in terms of training, staffing, program length, materials, and other cost factors. As the field attempts to move from small-scale demonstration studies to large-scale, research-based RTI implementations, this type of research will become increasingly important. For example, Mathes et al. (2005) present a second-tier intervention model for first-grade students using a 1:3 ratio of teachers to students. This small-group intervention consists of daily 45-minute lessons across the school year. These students make substantial gains, but do not reach the average of their first-grade peers. A one-on-one intervention might serve three students individually in the same timeframe across the year. If two of the one-to-one students achieved average performance levels and the third made some gains (Schwartz, 2005b), which program would be more cost effective? What would be required to bring each program to scale? Mathes et al. (2005) presented a carefully controlled experimental study, but they indicated "little is known about how best to provide staff development and support to teachers as they work to implement new innovations. Even less is known about maintaining and sustaining innovations" (p. 180).

The 20-year history of Reading Recovery in the United States provides a basis for further research on these issues (Schmitt et al., 2005). The goal of professional development in Reading Recovery is to support the contingent teaching decisions described in the previous section. Reading Recovery teachers participate in a community of practice characterized by multiple-activity settings (Gaffney & Anderson, 1991; Schmitt et al.; Schwartz, 1998). These activity settings include the daily instruction of children in one-to-one lessons, group discussion of literacy observations and teaching decisions during demonstration behind a one-way mirror, follow-up discussion of these lessons with colleagues, school visits by colleagues and supervisors (teacher leaders) to observe and discuss individual lessons, and professional conferences (Schmitt et al.). Many of these activities occur in the context of a yearlong professional development program during the initial school year as teachers begin working with children in Reading Recovery. After this initial year, teachers continue to participate in these professional development activities several times each year. This level of professional development is considerably more extensive than training procedures used in most experimental studies. Reading Recovery teachers view the initial training year and subsequent continued professional

development as extremely valuable professional experiences. Yet, as they reflect on these experiences, they often characterize them as challenging and, at times, extremely frustrating (Pinnell, 1994). To some extent, all of these reactions may be necessary aspects of effective professional development. Engaging in a continuous learning process that taps complex situated understanding can be unsettling.

Why is professional development in this context so complex? Spiro, Feltovich, and Coulson (1991) identify two reasons: (a) concept complexity, and (b) across-case irregularity. Across-case irregularity is fairly clear for at-risk beginning readers. There is great variation in the children we label at risk on the basis of low achievement in classroom settings. A performance-based assessment such as Clay's (2002) Observation Survey of Early Literacy Achievement quickly illustrates variation in cases. Children differ in item knowledge, literacy processing, aspects of oral language including phonemic awareness, and other literacy-related knowledge. The situation is further complicated by changes that result as children learn (Clay, 2001). Whereas we have fairly detailed descriptions of how effective readers process words in text (Stanovich, 2000), at-risk students may take very different paths toward this goal (Clay, 1998). All these factors contribute to the across-case complexity of early literacy instruction.

Conceptual complexity also pervades literacy instruction. Spiro et al. (1991) characterize this aspect of complexity as involving the "simultaneous interactive involvement of multiple, wide-application conceptual structures (multiple schemas, perspectives, organizational principles, and so on), each of which is individually complex" (p. 25). Effective teaching decisions in an intensive early intervention should be guided by the high-level goals of promoting independence and accelerating learning. Schwartz (1997, 2005a) described processes for self-monitoring and searching that change rapidly for beginning readers and that teachers must infer from a child's oral reading behavior to respond effectively. Opportunities to individually observe and interact with children who learn in many different ways help teachers to situate their knowledge as they teach and learn in this ill-structured domain through the ongoing support of a professional community of practice. Palincsar, Magnusson, Marano, Ford, and Brown (1997) defined a community of practice as a setting in which

learning and development occur as individuals participate in the socio-cultural activities of a community, transforming their understanding, roles and responsibilities as they collaborate with knowledgeable others in carrying out activities

that are explicitly connected with the practices of the community. (p. 1)

The knowledge that teachers develop as they enter into a community of practice is far more complex than a set of facts or instructional routines. Learning in this context involves a complex set of interrelationships among concepts, observations, instructional procedures, and ways of interacting in the social settings of lessons and professional development (Lave & Wenger, 1991; Rogoff, Matusov, & White, 1996). We need more research on systems for professional development that support this kind of teacher learning.

Is literacy instruction as complex as rocket science (Moats, 1999)? No, it is almost certainly more complex. Given the same inputs, rockets will usually respond the same way. Children don't. Even the most powerful computers never achieve the level of language learning displayed by most at-risk first-grade children. A transactional view of ability recognizes that children differ in the knowledge they bring to instruction, but they all bring knowledge. With beginners or novices it is easy to focus on what they don't know. Effective instruction starts with what the child knows and builds on these strengths (Bransford, Brown, & Cocking, 1999; Clay, 2001). A child may appear able or disabled within a context depending on the skill of the teacher in adjusting to the child's strengths (Clay, 1987). Even the best teachers can only make minimal adjustments in whole-class or small-group settings. Individual tutoring and extensive professional development to support contingent teaching are likely to be critical components of an RTI system designed to greatly reduce or eliminate reading difficulties. A transactional view of reading *ability*, rather than *disability*, provides the best basis for research on systems that support the literacy learning of all students.

Conclusions

Our goal in this essay has been to adopt a transactional view of reading difficulties and instructional response in examining RTI, a movement that we believe offers educators an important opportunity to rethink traditional approaches to reading difficulties. As Gersten and Dimino (in this issue) point out, however, rethinking our response to students with reading difficulties must be rooted in the world as we find it; beautiful theory and popular legislation are not enough. Asking what we have done with past research results, therefore, may be as important as

questions about the kinds of research we ought to pursue in the years ahead. Many years of systematic study suggest the concepts of disability and deficit have not been useful in our efforts to respond to the needs of struggling learners, yet these concepts continue to exert powerful influence on educational practice, public policy, and legislation. Why? Unless we are prepared to be honest about the failures of the past, RTI may become just one more example of the overhyped reform movements that Gersten and Dimino lament.

Furthermore, although concepts certainly matter, it is also clear that the way we put concepts into practice has an equally profound influence on outcomes. Fuchs and Fuchs (in this issue) note that while education practitioners seem to prefer a problem-solving approach to RTI, most RTI research has adopted the standard protocol model, an approach that may undermine the very objectives RTI is intended to achieve by ignoring critical local conditions that expert teachers attend to and build on in everyday classroom interactions (see Klingner & Edwards in this issue). We are, however, encouraged to note the emphasis across all the articles in this NDR collection on the critical role of teachers in our efforts to implement and sustain RTI. We believe a serious effort will require a broader RTI research program that considers how teachers acquire and sustain the knowledge and expertise needed to be responsive to students and the relative costs involved in different approaches, as well as studies examining the literacy learning outcomes that result.

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